CASE SERIES: PULSATILE LOWER LIMB VEINS - HAVE A LOOK AT THE HEART

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INTRODUCTION: Respiratory phasic variation is a normal phenomenon in the lower limb veins. Whenever there is evidence of a pulsatile flow or a positive wave seen above the baseline it calls for evaluation of the cardiovascular system.

We present three cases of pulsatile wave form in the lower limb veins that had cardiac pathologies.

CASE REPORT:

CASE 1: A sixty year old female patient presented with history of breathlessness. On enquiring about the complaints; the patient complained of past history of being treated for tuberculosis. The lab investigations the values of Hb(9.8 gm/dl); Creatinine (2.1 mg/dl) and HbA1c of 9.8 % were found to be abnormal. Ultrasound of the abdomen showed features of chronic kidney disease with prominent hepatic veins and IVC. Mild hepatomegaly was seen and the liver measures 16.5 cms. CT thorax was done which revealed areas of fibrosis in the lung apices with dilated pulmonary artery and right atrium. The patient also complained of leg pain and to rule a vascular cause doppler evaluation of the vascular system of the lower limbs was done which showed extremely pulsatile spectral wave pattern. On correlation with the cardiac echo; moderate tricuspid regurgitation was seen.

CASE 2: A 50 year old female patient came with complaints of episodes of breathlessness with occasional episodes of swelling of the feet. Doppler evaluation of the lower limb veins showed evidence of positive waves above the baseline. On cardiac echo correlation; trivial tricuspid regurgitation was seen.

CASE 3: A 47 year old female patient came with complaints of dry cough and swelling of the legs since 20 days. The lab values were normal except for HbA1c of 7.8%. The chest x- Ray showed bilateral pleural effusion. After a diagnostic ultrasound of the thorax showed moderate pleural effusions; pleural aspiration was done. As the patient complained of swelling of the feet; doppler ultrasound of the venous system was done which showed a pulsatile spectral wave pattern. Echo correlation showed the patient to have mitral and tricuspid regurgitations.

DISCUSSION: The doppler spectrum is defined as quantitative display graphically of the direction and velocities of the red blood cells that are moving the given doppler sample volume.(1) Conventionally flow towards the transducer shows a graph above the base line and away shows a graph below the base line. In color doppler flow towards and away from the probe are signified

by two different colors, red and blue conventionally. During respiration the velocity decreases on inspiration and increases on expiration.[2]

In a normal patient the doppler waveform is usually phasic and spontaneous.[3,4] The changes in the right atrial pressure cause the phasicity in the lower limb veins[5]. No evidence of retrograde flow is seen in the lower limb veins; however in case of a elevated right atrial pressure it causes pulsatile flow.[6]

The doppler waveform is called pulsatile when there is a cyclical retrograde component i.e., an abnormal waveform above the baseline.[7] In case of tricuspid regurgitation[8] the portal vein can show pulsatile flow as can be seen in the case of congestive cardiac failure.[9] Pulsatile phasic variation may be respiratory[10] or cardiac[11] or occasionally both.[12]

Whenever there is a pulsatile flow in the lower limb veins it warrants for an immediate cardiac evaluation.

Increased right atrial pressure most commonly occurs due to tricuspid regurgitation which is caused due to the tricuspid annulus dilatation secondary to the enlargement of the heart. This gets transmitted to the lower limb vein.[6]

The retrograde velocity peaks in the lower limbs have a good correlation with the degree of tricuspid regurgitation.[13] Iliac veins, IVC, hepatic vein dilatation also facilitates the transmission of the right atrial pressure to the lower limb veins causing pulsatile flow.[6] The pulsatility secondary to right heart failure in the varicose veins may be transmitted up to the level of the mid-calf.[14]

In cases of severe tricuspid regurgitation the pulsatility in the veins protects against the complications of venous disease by secretion of cytokines by the venous endothelial cells which further prevents deep venous thrombosis by preventing platelet aggregation. It also promotes white cell adhesion thus promotes healing of the leg ulcer.[15]

CONCLUSION: The pulsatility in the lower limb veins is almost always an indicator of cardiac pathology and more commonly right heart failure.

Any inadvertent detection of pulsatility in the lower limn veins warrants an immediate and complete cardiac evaluation for early detection of the cardiac disease and prompt disease.

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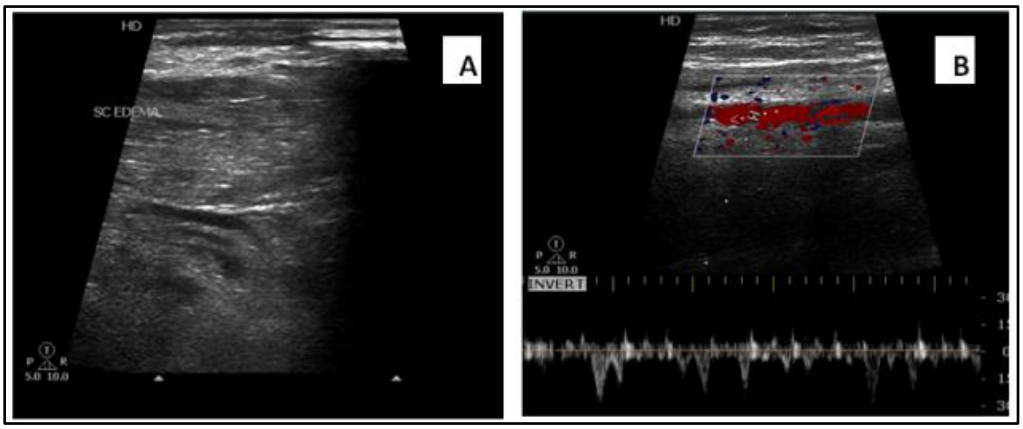
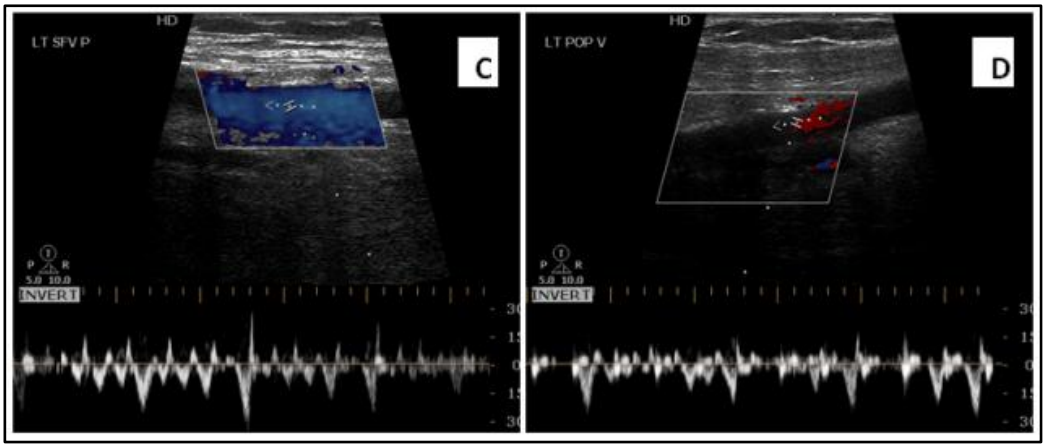
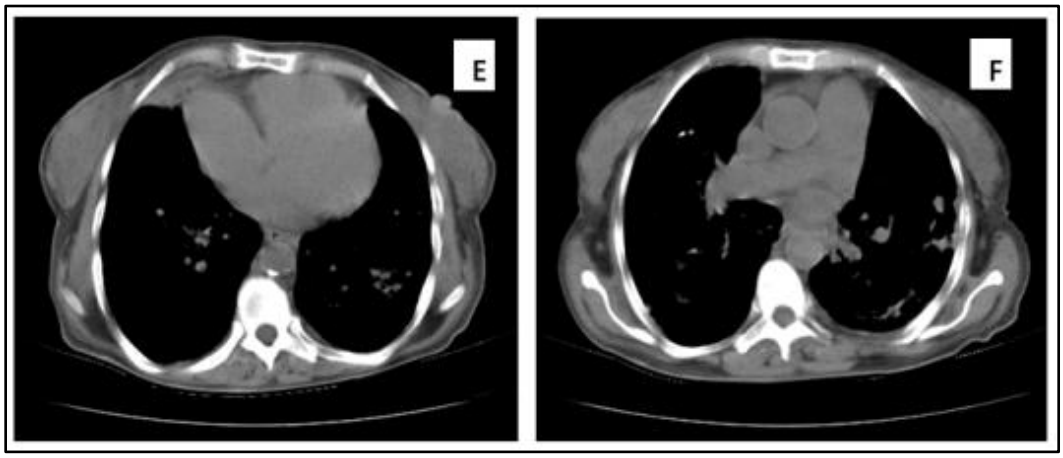
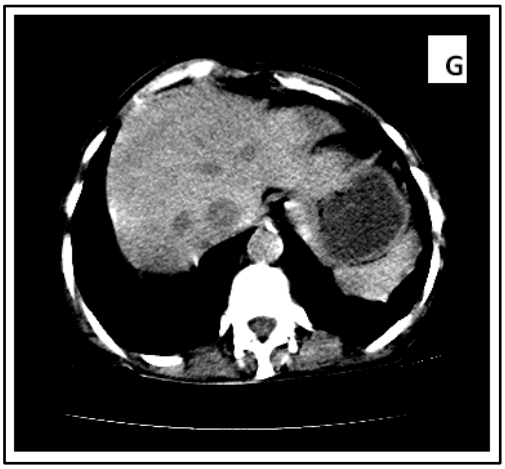
CASE 1:





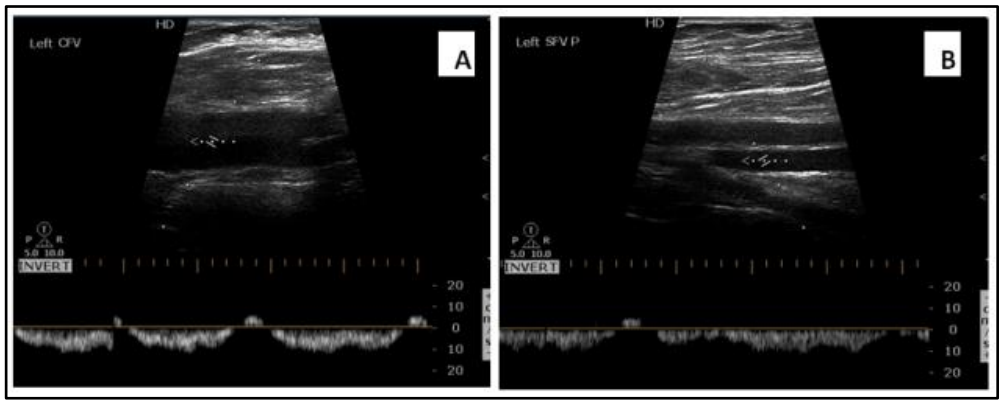
A- Subcutaneous edema in the thigh.
B- Pulsatile flow in the common femoral vein.
C- Pulsatile flow in the superficial femoral vein.
D- Pulsatile flow in the popliteal vein.





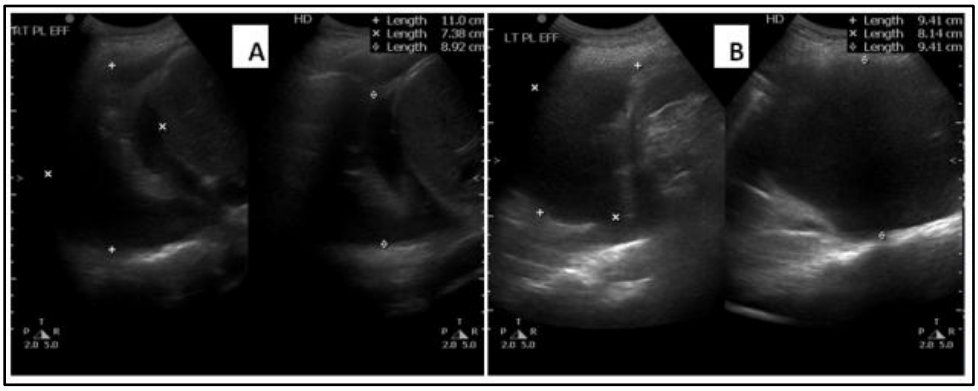
E- Enlarged right atrium
F- Dilated main pulmonary artery
G- Prominent hepatic veins and IVC

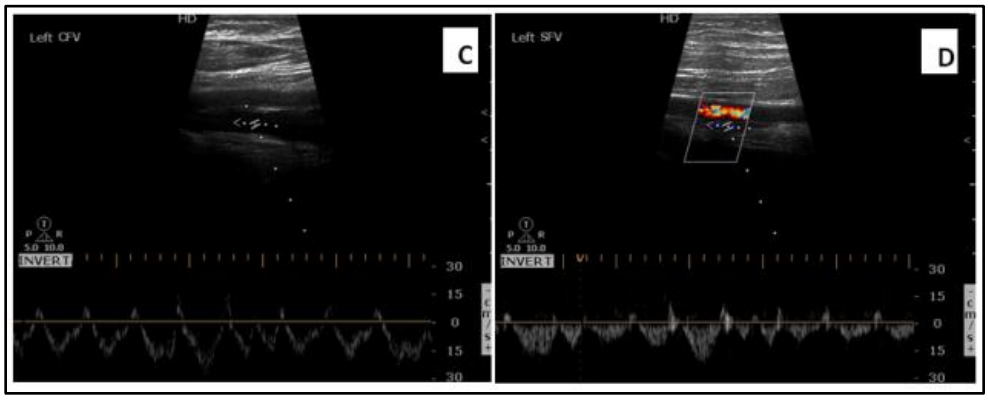
CASE 2:



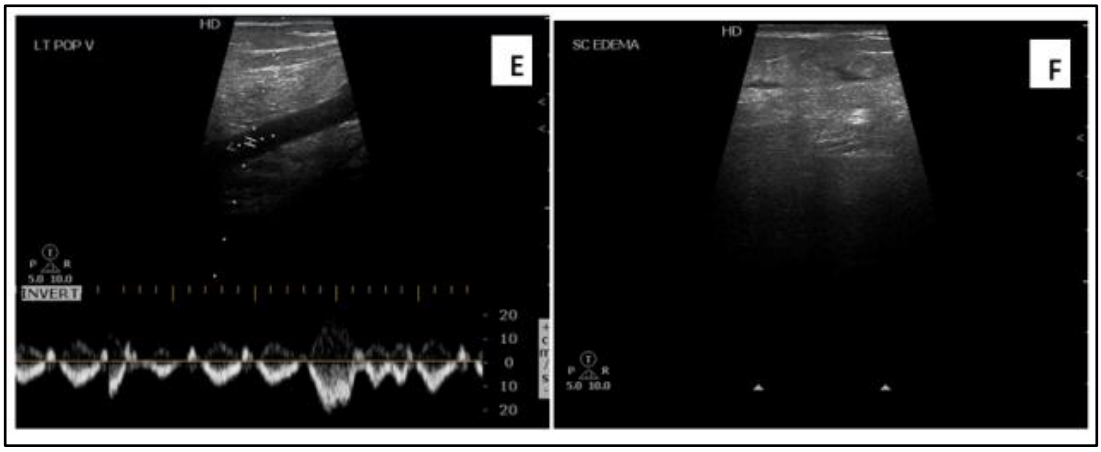
A- Positive waves seen above the baseline in the common femoral vein.
B- Positive waves seen above the baseline in the superficial femoral vein.

CASE 3:





A- Right pleural effusion.
B- Left pleural effusion.
C- Pulsatile flow in the common femoral vein.
D- Pulsatile flow in the superficial femoral vein.



E- Pulsatile flow in the popliteal vein.
F- Subcutaneous edema in the thigh.

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